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ABSTRACT

Organizations have unique functions for self-perpetuation over time regardless of mission. This paper addresses factors of organizational environments, as well as structure and design processes, that shape those perpetuation activities. Further, it proposes a contingency model that accounts for possible outcomes of organizational change that include: maintenance, adaptation, transformation, and death. Premised on basic evolutionary theory, this model argues that change outcomes are dependent upon perpetuation activities chosen in response to levels of organizational uncertainty and environmental turbulence. An illustrative case is presented in detail to demonstrate application of the model. An educational policy-making organization in a large university is analyzed in order to identify key factors of its structure and design processes developed in response to its environment over a 5-year period, which resulted in a transformation of the organization to a new form. (Two figures are included and 70 references are attached.) (Author/SR)

An Analysis of Organizational Change: A Contingency Model of Environmental Influence

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INTRODUCTION

A Theoretical Framework

Complex organizations have been described as sociotechnical systems where people and technology interact in producing outcomes. This interaction should be viewed as a process with recurrent features, e.g., regular and predictable cycles (Katz and Kahn, 1966; Perrow, 1987).

As in any system, organizations have parts that are interdependent. Subsystems of production, distribution, maintenance and adaptation are largely interrelated and have the potential to affect each other. Demand and resource environments have important impacts upon the shape organizations take. Organizations, as entities, adapt to changes in the environment in order to better pursue their specific purposes. Organizations are also constrained by forces that render outcomes somewhat unpredictable. Yet, organizations must decipher the outcome of their activities and take that feedback into account in order to maintain equilibrium within their environments.

As open systems, organizations need to maintain a favorable balance of input and output transactions with the environment in order to survive over time. The loss of vitality in an organization is often directly related to a failure to use feedback or reflexive self-monitoring (Weick, 1979; Giddens, 1979) for development of adaptive strategies that serve to maintain the adequacy of production and distribution subsystems. Ultimately, maladaptation will lead to loss of a place within the niche the organization serves and lead to organizational death.

Nadler and Tushman (1977; Nadler, 1981) have described an organizational systems model as comprised of three elements: 1) inputs -- as an organization's environment, resources and history; 2) transformation or throughput processes -- as its strategies (consisting of the organization's task, individuals who perform them, formal organizational arrangements and informal patterns of communication, power, influence, values and norms); 3) and finally, its outputs -- as organizational, group and individual performance and affect. Organizations will be most effective when these components are congruent or achieve "fit" (Nadler,

1981).

The systems perspective as an adaptive process has also been understood as a model of evolution. Slightly different frameworks have been proposed to emphasize the processes of 1) mortality or selection (Freeman, 1982; Hannan and Freeman, 1977), adaptation based on incremental change in response to environmental threats (Katz and Kahn, 1966; March and Simon, 1958; Quinn 1981), or 3) transformation or metamorphosis through fundamentally different life-stages of organizations (Quinn and Cameron, 1983) which may or may not be deterministic (Mintzberg and Waters, 1982).

In addition to the basic input, throughput, output elements of the systems model, most researchers have acknowledged the importance of the environment as a determinant of the system. Organizations, not completely at the mercy of an immutable environment, can reactively or proactively enact strategic responses to influence or even alter their own environmental niches (Miles and Cameron, 1982; Pfeffer and Salanick, 1978). Examples may include lobbying for regulatory change or advertising to shape or stimulate demand.

Such attempts reflect organizations' use of information and persuasion to influence outcomes. Aldrich (1979) suggested that organization-environment relations can be viewed from a resource or information perspective. This paper takes the position that there should be an integration of perspectives. The selection of strategies affecting resource acquisition assumes that organizations have at their disposal some amount of information with which to address solutions, thus information is a resource.

Galbraith (1977) has said that the match between an organization's information processing requirement and information processing capability determines its effectiveness. Thus, another common theme running through research on organizational environments focuses on the concept of uncertainty or lack of necessary information as a pre-eminent characteristic for distinguishing between different adaptive responses. Uncertainty refers to the difference between the information or knowledge necessary to make good decisions and the amount of information available. As information availability decreases, the number of

choices available in the response repertoire to cope with the environment also becomes circumscribed. (See, for example, Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Child, 1972; Van de Ven and Joyce, 1981). Conversely, as organizations attempt to reduce uncertainty, they seek information to inform decisions that will enable them to maintain some level of autonomy, and thus to survive, without undue constraints.

The sheer volume of information processing can overwhelm an organization. As task uncertainty increases, the number of exceptions increases until managers are overloaded. New design strategies must be implemented to either reduce the amount of information processed or to increase the capacity to handle more information, or both strategies may be implemented (Galbraith 1977). Exceptions may be reduced by 1) lowering the level of required performance; 2) providing a task group with all of the information resources needed to perform a task; 3) or reducing the division of labor through cross-training. When exceptions are reduced, the amount of task uncertainty is reduced. For example, Japanese workers are commonly trained in all aspects of production, and because of this cross-training, may take responsibility for more varied tasks. The by-product is lowered defect rates.

This paper examines the effects of environmental factors on uncertainty reduction activities within organizations and proposes a typology of change outcomes. Uncertainty reduction processes are considered in this paper to be perpetuation activities. That is, organizational members engage in uncertainty reduction activities in order to perpetuate the existing organization. However, as environmental factors vary, different change outcomes may occur. The match between requirements and capabilities (Tushman & Nadler, 1984) will suggest the approach to perpetuation activities -- satisfactory outcomes yielding maintenance, adaptation, transformation, and unsatisfactory outcomes leading to death, or additional change decisions or perpetuation activities that may in turn lead to satisfactory or unsatisfactory outcomes.

In determining the match between organizational requirements and capabilities, this paper asserts that the primary requirement of organizations

is to deal with turbulence in the environment, and the primary capability of organizations resides in the organization's ability to reduce uncertainty. Turbulence or stability in the evolutionary literature refers to rates of fluctuation in environmental conditions, such as demand or resource availability. Likewise, changes in environmental turbulence have been associated with changes in organizational form and structure. However, the literature is less clear on precisely how organizations change given various environmental contingencies. Some organizations appear to have great resistance to change (Kruk, 1981; Staw, Sandelands and Dutton, 1981). Other organizations evidence adjustments to structure that are continuous or revolutionary (Cameron & Whetten, 1983; Kimberley, 1979), or involve major revolutions in structural arrangements occurring with regularity (Miller & Friesen, 1980; Filley & Aldag, 1980). Luck may also be an important contingency in explaining organizational survival (Levinthal, 1991).

Zammuto and Cameron (1985) suggested that variation in the nature of environmental conditions experienced by organizations will explain why a variety of structural characteristics will be observed as they attempt to cope with such conditions. Adjustments may vary from small, incremental change (fine tuning in response to fine-grained turbulence) to large-scale change (complete realignment in response to course-grained turbulence). (See also, Hannan and Freeman, 1988). Such adjustment may reflect four action strategies, according to Zammuto and Cameron (1985): change by deletion (elimination of activities), substitution (replacing activities), addition (increasing activities) or redistribution (relocating activities). Continuous change will be associated with smaller-scale adjustments.

This paper postulates that turbulence generates uncertainty by placing greater demands on organizational managers for current, accurate and relevant information. It also suggests that as turbulence and uncertainty co-vary, different change processes (perpetuation activities) and their outcomes, may be rendered predictable. We have called these outcomes maintenance, adaption, transformation, or death, the last of which is rarely a self-reflexive choice.

The Zammuto and Cameron action strategies may be analogues to our perpetuation activities; however, we do not consider these strategies as discrete, for any combination may be brought to bear in self-perpetuation. What is of critical importance is the degree to which information-processing or uncertainty reduction capabilities suggest appropriate choices.

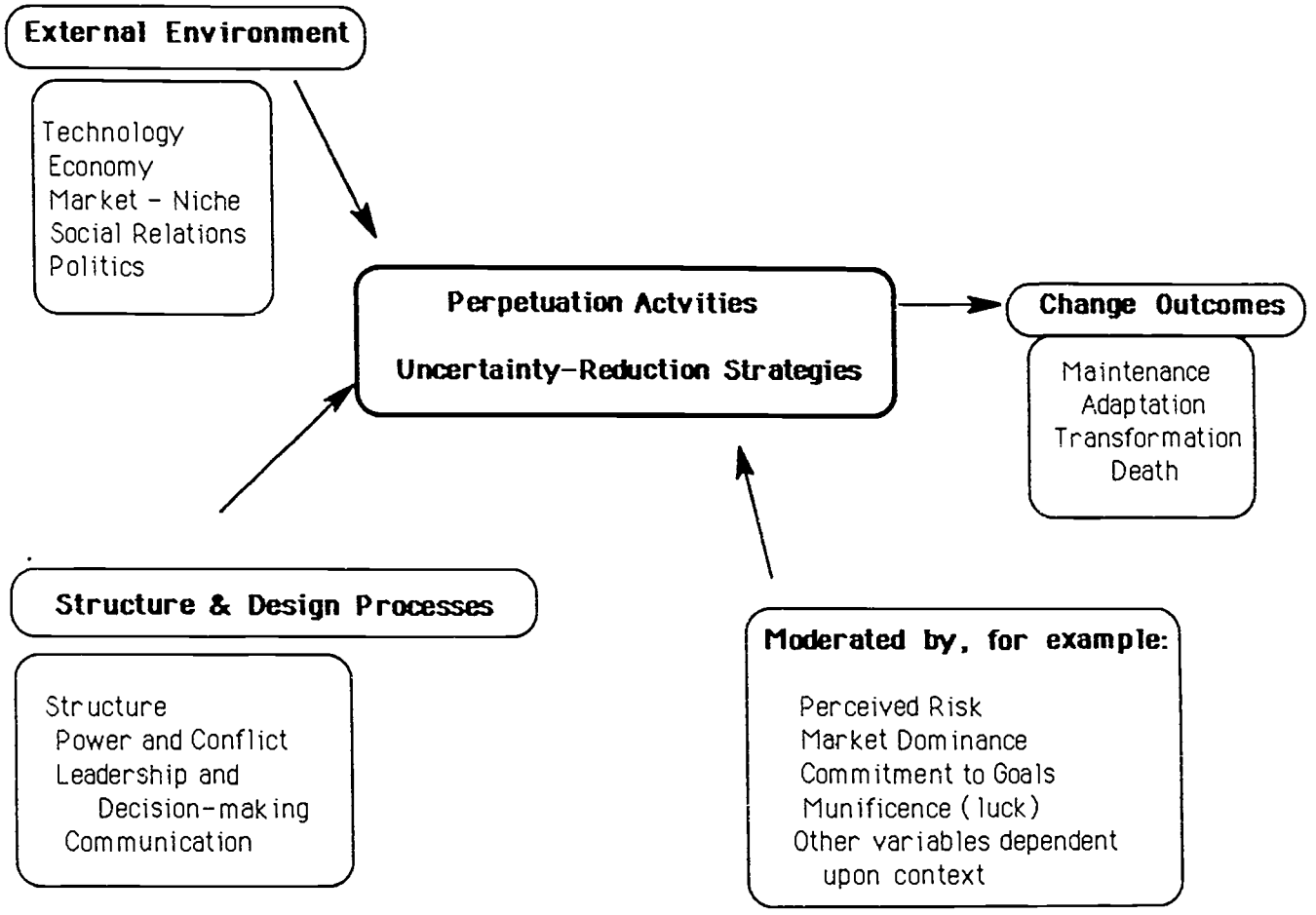
A Contingency Model

This paper presents a contingency model of organizational change, followed by an illustrative case study. This section of the paper identifies and lists variables included in the proposed model (see Figure 1, p. 6) representing change based on perpetuation activities that can be seen as an uncertainty reduction system. Variables in the change process include 1) the organization's environment, focusing on resource factors external to the organization that constrain its structure and process; 2) the organization's design (structure) and process (power and conflict, leadership and decision-making, and communication); 3) perpetuation activities or uncertainty reduction strategies; and 4) change outcomes, including maintenance, adaptation, transformation, and death. An elaboration of the model (see Figure 2, p. 16) is represented by a 2 x 2 matrix which shows that as the level of environmental turbulence co-varies with the level of organizational uncertainty (giving rise to perpetuation/uncertainty reduction activities), specific outcomes may be anticipated, e.g., maintenance, adaptation, transformation or death.

[Figure 1 about here]

Using the case, this paper describes how a non-profit policy research center, given a limited lifespan, analyzed its purpose, organized its task and executed its goals while facing certain death. One would expect the investment of participants in such an organization would be affected by the knowledge or the end of the task. No matter how rational that assumption, the case shows that as in all organizations, self-perpetuation or the struggle toward life is great, and

Figure 1
An Environmental Model of Organizational Change



perhaps even greater in a marked organization than among those that are assured or assume continuance.

Organization Environments

The environments of organizations are critical factors in understanding what goes on in and about organizations. Environments can be examined in terms of their content characteristics, such as technology, legal, political, economic, demographic, ecological, and cultural influences, or in a more abstract and analytical systems sense (Ledford, Mohrman, and Lawler, 1989), looking for characteristics such as stability or turbulence (Lawrence and Lorsch, 1986). In either case, the physical environment and the nature of the resources available place constraints upon the kinds of activities in which an organization can engage.

Environments provide the resources necessary for organizations to maintain stable levels of operations. Aldrich (1979) highlights the importance of an organization's external environment in keeping organizational operations going. Turow (1985, p. 219) elaborates: "It is the environment that provides people for the recruitment into the organization; supplies used in the performance of the organizational activities; required information, permission and services to help the acceptability or permissibility of its activities in the environment; and money to pay for it all."

In order for organizations to attract environmental resources, exchanges must take place. The medium of exchange will be determined in part by the materials available and by the social value placed on the materials by members of that society. Thus, organizations must be cognizant of how dependent they are upon relationships within the external environment which have consequences for smooth organizational operations.

The environment imposes numerous constraints upon organizations. Aldrich (1979, p. 4) suggests that awareness of environmental constraints may be called the "resource dependence perspective."

> The resource dependence perspective ... goes beyond the idea of simple exchange in arguing that one consequence

> of competition and sharing of scarce resources is the development of dependencies of some organizations on others... The implicit assumption made regarding managerial and administrative behavior is that major goals of organizational leaders are avoiding dependence on others and making others dependent upon one's own organization. The general picture is one of the decision-makers attempting to manage their environments as well as their organizations.

For non-profit organizations such as the case considered in this paper, activities directed at acquiring material or symbolic resources through fund raising, marketing, and lobbying may be of greater importance than for for-profit organizations. Activities aimed at securing public support and approval in non-profits are important for assuring a steady stream of resources for organizational survival, particularly if the organization's products are more symbolic in nature (ideas, policies) or if the environment is regulated. Such constraints may place limits on the extent of resources available to organizations operating outside the customary environment of market forces (Azumi, 1972). Without such forces, non-profits are severely challenged to achieve or sustain optimum levels of performance. Especially in the case of state-funded institutions, neglect of enabling publics (those that provide resources) could mean relinquishing control of external funding provided by legislatures, foundations or coordinating boards (Spitzberg, 1980; Folger, 1980). Organizations engaging in support or approval-seeking activities are attempting to "enact" or shape their external environments and thus, such activities qualify as perpetuation or uncertainty reduction activities. A current example may be seen in the perpetuation activities of state colleges and universities who in this recessionary environment have been carefully presenting their cases to state legislatures in order to maintain or increase their resources.

Organization Design and Process

Processes within organizations both result from structure and lead to it, simultaneously. Processes such as enactments related to power and conflict, leadership and decision making, and communication lead to organizational goal attainment, or failure to meet goals (Hall 1982).

Structure

Organizational structure is often understood as the framework that guides processes within a system. Giddens (1984) defined structure simply as the "rules and resources" understood and utilized within a context. Traditionally, structure has been understood or measured by focusing on enacted rules, formalized relationships, and utilized resources. Characteristics or artifacts of structure include organizational hierarchy, strategies and practices, configurations of technology, in-place information systems, and human resources.

The primary virtue of rules is that they specify appropriate or routine processes and, therefore, eliminate the need for further communication among subunits. To the extent that job-related situations can be anticipated in advance and rules derived for them, integrated activity is guaranteed without communication. But as uncertainty increases in organizations, the amount of non-routine communication and decision-making also increases. As information collection and problem solving activities increase, new roles must be created to handle the information collection and decision tasks necessitated by uncertainty (Galbraith 1973). This may give rise to vertical hierarchy as in mechanistic organizations, or when information becomes overwhelming, it may result in creating semi-autonomous task groups with sufficient resources to eliminate exceptions through their own problem-solving interactions, a response more common to organic organizational forms (Burns and Stalker 1961).

Power and conflict

In addition to structure, a hierarchy of authority and reward power generally emerges in both mechanistic and organic organizations, so that the decisions of the role occupants are effective determinants of the behavior of task performers. Authority is employed to deal with exceptions. When there is no preplanned response, the problem may be referred to permit the creation of a new response. Authority is employed in addition to, not instead of rules. Rules achieve coordination in uniform situations, whereas power is defined by the capacity to handle exceptions (Galbraith, 1977).

Power relations suggest that there are individuals who are less powerful,

and who are therefore dependent. Parties to a power relationship are tied to each other by mutual dependency (Bacharach and Lawler, 1980). Power tends to coalesce around those who perform the most critical function in an organization, that function centering on perpetuation activities through uncertainty reduction. Whether the power is hierarchical and formalized or decentralized and more subtle, power involves changing coalitions, negotiation and persuasion in interdependent relationships. Power leads to compliance or conformity. Pfeffer (1981) suggests that organization members find ways to counter power through the formation of coalitions and counteractions. While these often emerge from established organizational groupings and procedures, they may later develop into unsanctioned subgroups.

Giddens (1979) conceptualizes power relations in social systems as regularized patterns of autonomy and dependence, which he calls the "dialectic of control" (p.6). Power relations in organizations is always two-way, since even a subordinate in a social relationship gains a certain amount of control over the other party through mutual involvement in the relationship. Hence power contributes to interdependence and serves to function as a control mechanism within a system. Rules that legitimate relationships regulate power relations, adding stability; but when uncertainty and information needs increase, power relations may supersede rules.

Leadership and decision-making

Leadership is a concept closely related to power. The task of leaders in part consists of defining organizational missions and roles, building policy, defending the integrity of the organization and controlling internal conflict (Stogdill, 1974). Leadership can occur at any level. "It is the persuasion of individuals and innovativeness in ideas and decision making that differentiates leadership from the sheer possession of power [control]" (Hall, p. 161).

Leaders often occupy positions of power and authority and in these roles have greater access to information and greater control over its dissemination (Clegg, 1989). Responsiveness to environmental factors may, thereby, be constrained by leaders. As decision-makers, leaders must face many conflicting

pressures, because a movement in one direction is likely to trigger countermovements in others. At the same time, leadership is critical for the organization as new contingencies are continually faced and as perpetuation activities are continually indicated or enacted.

Communication

Communication in organizations involves a complicated process, central to effective leadership, decision-making and exercise of power. Communication is shaped by organizational structure and continues to reshape structure. (Katz and Kahn, 1966/1978). For example, highly structured (mechanistic) organizations tend to constrain the amount of communication flow to narrow, top-down channels in order to increase coordination and control while more loosely structured (organic) organizations are characterized by greater volume and freer horizontal and vertical communication (Hage, 1980; Theus, 1991). In fact, the latter structure is very much linked with the capacity for an organization to change or innovate, because greater communication permits greater exchange of information. In uncertainty reduction activities, communication in hierarchies is directed to an authoritative source where exceptions are considered; in lateral organizations, task groups are arranged with sufficient resources and authority to communicate about and to solve problems where they originate. The current trend toward restructuring and decentralizing to maximize opportunities for innovation in research and development organizations (such as IBM) serves as a case in point.

Communication is also a necessary link with external environments. It is a particularly important feature of non-profit organizations such as the one considered in this study, partly because products are largely ideational and must be operationalized in ways that may be communicated and understood by external audiences.

Perpetuation Activities or Uncertainty Reduction Strategies

Organizations have specified task functions that are generally understood by organizational members. Further, organizations develop social norms over

time, which dictate the nature of relational ties for members while they fulfill the understood tasks and goals of the organization. However, an additional element influences organizational activity: the on-going drive that develops to perpetuate the organization.

Perpetuation can be understood as the activities in which organizational members engage over time to match the organization's demands for information with the requisite management of turbulence of its environment. In other words, perpetuation activities should reduce uncertainty about factors in the environment by stabilizing or controlling the change process. Specific activities would include policy-making activities, development of explicit rules and procedures, and reification of organizational hierarchy (including specifying channels for decision-making, delegation, or allocation of resources). Many long-standing organizations "re-organize" or "re-design" themselves continually, calling these activities "stream-lining," "down-sizing," "strategic-planning", "human resources development" or even "expansion-planning." Zammuto and Cameron (1985) have suggested these activities may be characterized as deletion, substitution, addition and redistribution.

Most organizations develop specific and explicit socialization or assimilation documents so that new members can more quickly understand rules, norms, and policies that guide behavior and the utilization of resources. Many organizations designate functional positions where members engage full-time in activities that attempt to stabilize their environments. Many policies, rules, and norms are developed to govern the use of resources. In fact, how resources are realized and utilized helps to define organizations within their market environments.

Resources can thus be seen as a way of defining how organizations coordinate within their environments in order to be self-perpetuating. Giddens (1984) makes the distinction between allocative resources and authoritative resources, asserting that coordination within a social system (environment) necessarily involves a combination of both types of resources. *Allocative resources* include 1) material features of the environment; 2) means of material

production/ reproduction; and 3) produced goods. *Authoritative resources* include 1) organization of social time/space; 2) production/ reproduction of relational ties within a system; and 3) organization of life changes (self-development and self expression). The essential difference between these two kinds of resources is that authoritative resources involve intangible human values and cultures which determine the utilization of allocative resources or material products. In short, authoritative resources are determined in the system of the enacted rules and power relations known and reinforced in interaction. Allocative resources are accessed through the enactments of both the system and individuals' authoritative resources. For example, an authoritative resource might be the control a manager is permitted to have by virtue of his position in the organization. By exercising that control the manager may utilize allocative resources such as space, materials or money.

Allocative resources have been given dominance in many theories as determining the bases of power within an organization, but Giddens argues that both are "infrastructural." It is clear that the garnering of allocative resources is closely involved with the continuity of the organization over time (and thus the generation and maintenance of power). Augmenting material resources is fundamental to the expansion of power, but allocative resources cannot be developed without the 'transmutation' of authoritative ones, and thus the latter (authoritative resources) are most often seen as "levers" in social change.

The storage and maintenance of both types of resources may be understood as involving the retention and control of information or knowledge. Since one needs authoritative resources to utilize allocative ones, they constitute together the recognized power of an actor within an environment, who may then enact perpetuation activities aimed at uncertainty reduction. This may be equivalent to the notion that an organizational member must have both a legitimate power base and access to resources in order to be considered a "player" (Kanter, 1977).

Uncertainty reduction activities, particularly those aimed at stabilizing organizational processes influenced by fluctuations in environments, may focus

around the development of policies, rules, norms, and structures to cope with fluctuations or turbulence in the environment. There are many variables that influence uncertainty reduction activities. The ones which become salient for any given case depend on the specific organization and the context of the change. Such variables may include: degree of perceived risk to control, power, ambiguity, stability or security in organizational life (Nadler, 1981); the perceived importance of organizational mission to publics, the strategic orientation with respect to research, innovation and flexibility, and the positioning of the organization within the market for the created products (Tushman and Romanelli, 1985); or the level of commitment of members to the organization, the correspondence between individual and organizational goals, and the perceived individual gain from the change (Giddens, 1985).

There are more variables that influence uncertainty reduction activities than these. As organizations enact their own environments, they will encounter different factors that influence members in how they engage in reducing uncertainly.

Outcomes of Change

This paper proposes a very basic model to frame organizational change processes and alternative outcomes of organizational change. It proposes a theory that change alternatives occur in response to perpetuation activities directed toward uncertainty reduction in response to environmental turbulence. Unlike March (1988), we do not believe that turbulence, uncertainty and change only appear to co-occur. We postulate that, given varying amounts of environmental uncertainty, continuous and fine-grained fluctuations within the environment will lead to two alternative system results: maintenance (the organizational system stays relatively constant) or adaptation. At the other extreme, discontinuous, rapid, coarse-grained and unanticipated fluctuations will lead to two possible system results: transformation (mutation) or death (unsuccessful perpetuation, or additional perpetuation activities which may or may not be successful). These four possible outcomes (maintenance, adaptation,

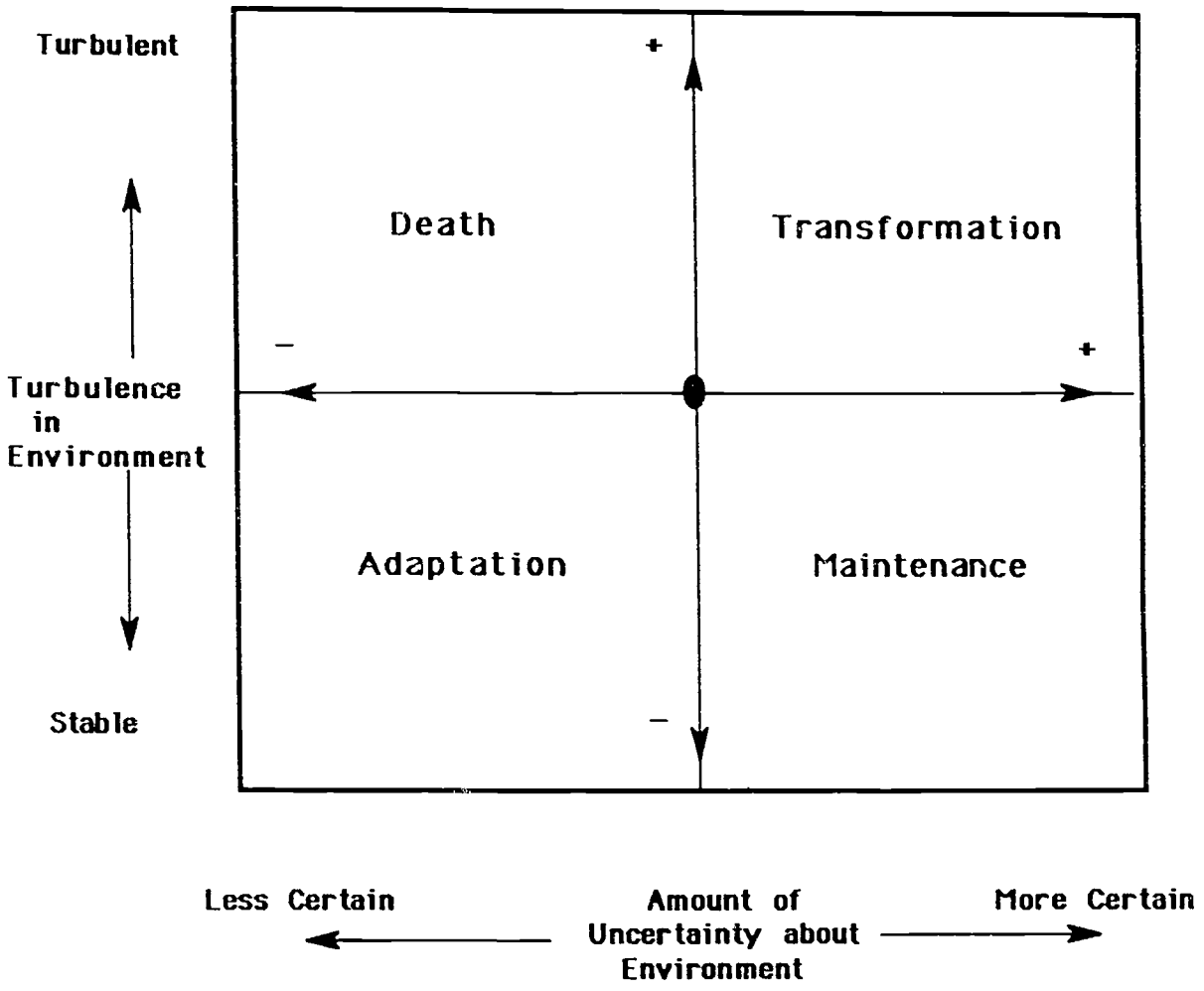
transformation or death) all occur as a result of fluctuations or turbulence in environmental conditions, moderated by the amount of information about the environment available to organizational members. (See Figure 2 for model).

This topology does not imply that change always occurs when it should or that change cannot be dysfunctional. Occasionally great capitalization or luck (or misfortune) can buffer organizations and alter their change processes (Levinthal, 1991). Perpetuation activities may lead either to improvements or dysfunctions leading to decline (Zammuto and Cameron, 1985). But presumably, in declining situations, organizations will undertake self-perpetuation alternatives when threatened, so long as resources are sufficient to continue such efforts.

Decline results from "decreased demand for products and services, increased government regulation that constrains performance, technological developments that render current products or services obsolete, or decreased levels of available resources" (Zammuto and Cameron, 1985, p. 227). Organizations will undertake perpetuation activities when environments manifest the above turbulent conditions. New approaches may be required if organizations are to survive transitions in product or service demand or technological innovations that make past products or services obsolete. The pattern of fluctuation or turbulence in the environment and the amount of uncertainty in approaching solutions are important factors in determining managerial response.

Two kinds of fluctuation or turbulence are postulated although they are really opposite ends of a continuum: continuous (consistent with past experience) and discontinuous (deviation from past experience). (See, Srinirasan and Ramanujam, 1981). In addition, these fluctuations may be regarded as fine-grained (fairly common and of short duration, e.g. shifts in personnel) or coarse-grained (environmental variation of relatively long duration, e.g., shifts in niches). (See, Hannan and Freeman, 1977). The finer grained the fluctuation, the more likely information based on prior experience will be of assistance in resolving the dilemma. The coarser-grained the fluctuation, the less previous solutions will apply and the greater the uncertainty in determining managerial response. For specific rationales underlying the four alternative change patterns, each has

Figure 2
A Contingency Model of Change Outcomes



been addressed separately below.

Maintenance

Of the possible change outcomes of perpetuation activities, maintenance may be the one organizations strive for most frequently. Maintenance occurs in the absence or fluctuation or turbulence, and when information, often based on past experience, is readily available to reduce uncertainty in the environment. A rule of thumb, applied from similar cycles may be sufficient to ensure continuance. Maintenance does not require active information seeking, because organizational decision-makers may not perceive the need for new information to address environmental variation. Information that randomly comes into the organizational orbit will be processed, so long as the variation is recognized (Grunig and Hunt, 1984). Note, however, that static organizational information-processing, as predicted by systems theory, may lead to obsolescence of organizational form over time (Hannan and Freeman 1988). Thus organizations focusing on self maintenance are vulnerable to entropy in the long term unless they unconsciously adapt and thus achieve a "moving equilibrium" (Olson, 1965).

When organizations specialize within relatively narrow domains over which they have developed considerable expertise, perpetuation activities directed toward maintenance will likely occur. This is because, under stable and well-understood conditions, specialist organizations utilize resources more efficiently, allowing for 1) economies of scale, 2) reduction in need for excess capacity to buffer the organization from the effects of changes in demand, 3) reduction in the amount of resources that need to be devoted to coordination activities (Hannan and Freeman, 1977). Generalist organizations, on the other hand, engage more broadly both in terms of scope and domain activities (Aldrich, 1979) and may have greater difficulty in assessing the relatively specific information needed to achieve efficiencies of scale, capacity and coordination (Zammuto and Cameron, 1985). The more generalist the organization, the broader the range and scope of necessary information needed to reduce uncertainty.

Adaptation

While striving for maintenance may be the conscious goal of most organizations, adaptation is the outcome most organizations achieve. Adaptation occurs under conditions of relative stability in the environment, where there is some degree of uncertainty about environmental factors, such as change in niche size (carrying capacity) or niche shape (transition of market needs). Organizations that adapt to changing environmental factors will develop new policies, rules, and norms to stabilize the organizational system. This is because organizations will recognize discrepancies between that which was thought to be known, and that which is known. In recognizing problems and uncertainties, they will be likely to process information, and may seek it outright (Grunig and Hunt, 1984), and will thereby take that information into account when undertaking self-perpetuation activities. The information gained (and uncertainty potentially reduced) will be used to exploit resources available within the environment to gain a competitive advantage over other organizations, generally through attempting to maximize efficiencies (Pianka, 1983). Adaptation occurs gradually. It can only be measured over (often extended) periods of time, usually through the retrospective comparison of old and new policies, rules, and norms. A turnover in members may lead to adaptations with new rules, policies and norms, developed as new members begin to influence the organization. Adaptation may also be seen in the development of a new product line in response to changing competitive pressures.

Transformation

Perpetuation activities resulting in transformation involve large-scale organizational change that would be recognized by members as a different organizational form, a new organization, or a definite structural modification of the existing system. Transformation is often labeled "reorganization." It occurs in a turbulent environment when information and resources for dealing with challenges are certain. Under such conditions, information processing and seeking will be directed at reinforcing perceptions (Grunig and Hunt, 1984) about the appropriateness of solutions that might be employed, as well as extending the

information base that may assure success. Strategies may involve exploitation of resources as they first become available (such as swift expansion into new areas, enabling the setting of industry standards, attainment of cost advantages or high profits). Transformation tends to occur rapidly, in response to an imbalance between environmental demands and a potentially obsolete organizational form. The focus will be on gaining a competitive advantage, especially when resources are in short supply (Pianka, 1983), or on recapturing a lost or vacant niche within a market.

Death

Death or organizational collapse represents the culmination of a failed change process or several failed processes, or may be pre-ordained by fiat, in which organizational members actively choose not to act to sustain operations. Death usually occurs in a highly turbulent environment, where uncertainty is great, and when actors do not have information resources necessary to achieve equilibrium or to enact alternatives in appropriate ways. Information seeking and acquisition, under conditions of high turbulence and great uncertainty, will be actively attempted in order to try to reduce uncertainty and to provide alternatives. It may be suggested that under these conditions, organizations can engage in uncertainty reduction activities which may successfully avert death, for a different change outcome. However, organizations may generate more information than can be assessed, overwhelming or paralyzing decision-makers under the sheer weight of its magnitude.

This is not to say that organizations may not do appropriate things by accident (Levinthal, 1991) or that some environments may be so munificent that organizations survive despite their mistakes or inability to make appropriate decisions. Death generally occurs when random luck and high munificence do not affect a failed process. The notion of extinction follows the general principle of exclusion (Gause, 1934) or collapse (Zammuto and Cameron, 1985) which suggests that most efficient organizations within a niche will become dominant and less efficient organizations will face extinction (Gould, 1980).

Understanding the Case: Application of the Model

Case research is one appropriate method for the development and testing of theory. A case may be selected because it offers evidence and fulfills all the conditions or requirements necessary for testing a specific model or theory. Alternatively, a case may be chosen as it provides a unique research opportunity, often based on access to information or situations. Yin (1984) argues that an exemplary case must be significant, complete, must consider alternative perspectives, must display sufficient evidence, and must be written in an engaging manner. This case draws on participant observation; historical data, such as organizational charts, quarterly reports, memoranda, archival records, refunding proposals, budgets and communication documents; unstructured interviews with organizational members during its five-year lifespan; and physical artifacts, such as products disseminated by the organization. The case is presented to show how the model works and therefore to show its plausibility.

If pressures from the organization's environment are critical to its perpetuation activities, then of central concern for this study is the degree to which a time-bound organization, with a specific date of death, manages environmental fluctuations (i.e. perpetuates itself in the face of certain death) while attempting to achieve its mission. These particular factors represent a unique test of the predictive capacity of the model.

The organization selected as a site for research was an educational policy research center, whose mission was not only to develop public educational policy through analytical work, but to make the results of research available for the use of target audiences within the limited life span of the organization. It was born through the acquisition of a large five-year grant. Its central headquarters was a large public university. Organizational members were largely researchers with advanced degrees, or their associate staff, all of whom were post-baccalaureate and many of whom were actively pursuing terminal degrees. These individuals actively collaborated to bring the Policy Center into being, and earnestly looked forward to having an impact in the world of academic and social policy.

In assessing the likelihood of success in this endeavor, the Policy Center had to make certain commitments for the five-year life span of its activities. It had to remain financially viable and solvent; it had to establish legitimacy; it had to develop credible policy perspectives and products; and it had to make sure that the results "made a difference" in reformulating educational policy at institutional, state, and federal levels, or its work most certainly would fail to have a positive impact on educational consumers. Thus, the impact of research on the public interest was of foremost concern.

The Environment

The Policy Center's external environment presented several challenges. Because the Policy Center was funded through a competitive process by a grant agency, its selection for funding set up the perception among target publics of a "potential for excellence" as compared to the several existing policy centers designed to do similar work that were not awarded grant funds. Because funding would be held constant for five years, the primary uncertainty for organizational leaders concerned where the organization would fit among other organizations of its type. The dominant factor in determining the evolution of this organization initially, thus, was in achieving a position of prominence within its market niche.

Funding for the Center was substantial ($1.3 million per year) for the entire life of the organization. The task initially set forth focused not only on initiating research but on achieving name recognition, legitimacy, and credibility parallel to or greater than those educational policy centers already represented in the environment. To do this, Center communication efforts concentrated attention on collaborators in the policy research field and potential users of end-products even before those products were created or readied for market. Thus, a communication objective, raising awareness among opinion leaders, became a primary means of uncertainty reduction in the first year of the Center's work.

For example, the Center set the stage for its debut with appropriate news

releases and receptions, many of them held at meetings of professional educational associations. A logo and "look" for publications (products) were developed, and brochures were written and distributed at national meetings and through direct mail. Other brochures and fliers followed that focused both on individual research efforts and on the mission of the organization as a whole.

The Center also placed institutional advertisements in educational media, which described the mission of the Center and alerted the education and general press of programs and conferences as they were offered by the Center. In general, these approaches generated a great deal of response in anticipation of work to come, and in terms of marketing, a demand for products. Taken together, they enabled the center to reduce uncertainty and to establish a substantial hold within the market in a relatively short time.

Even though nine new or continuing projects per year received separate budgets that included some outreach or dissemination, the Policy Center administrative budget also provided resources to develop and disseminate products from newly completed work. Administrative seed-money enabled continued contact with general and educational media, professionals in education, policy makers and members of the research community. A variety of media products and activities were developed over the five-year life span of the Center, including newsletters, position papers, proceedings, pamphlets, guides, handbooks, digests, audiotapes, computer models and software, workshops, seminars, and conferences. However, the Center's use of these media was dictated by first understanding target publics and second by attempting to position products to enhance their potential use by and impact on target publics. Lay audiences, such as parents and students, only became communication targets as research suggested the development of products that would meet the needs of these groups.

Center products from research, increasingly over the five-year lifespan, generated reciprocal revenue streams to supplement grant income. These new inputs increased allocative resources that introduced potential uncertainty about the ability to become economically self-supporting longer-term. As more allocative resources (in terms of dollars) came into the Center, researchers began to assume

they had more authoritative resources (control) over Center operations. As time progressed, funds were also sought and gained from collaborators in research, such as associations and foundations, and from consulting. Time began to be viewed as an ally rather than as an enemy, and the perception was reinforced by demand for Center work.

Each component of the research agenda was subject to annual review by external judges. Projects providing the most potential for impact were continued and those failing to show value were replaced. This approach, adopted in response to shifting needs of publics, characterized the turbulence in the environment, which translated into uncertainty in direction among those who carried out the research program coupled. This uncertainty, however, was accompanied by a thirst for continuance through developing relevant and excellent research products.

Organization Design and Processes

The start-up of a new organization does not occur without transitions. Such was the case for the Policy Center. The grant was obtained through the collaboration of several industrious researchers, but the administration of the Center, once chartered, required a national search for an executive director that took the better part of the a year. Meanwhile, an interim structure was set up to carry out the immediate goals of public awareness and initiation of research. An acting executive director, an assistant director for research, and an assistant director for administration coordinated these functions.

But in terms of organizational mission, the interim staff focused on the successful acquisition of the grant, selection of support staff and creation of a culture of self-congratulation as the start-up process got under way. When the permanent director was selected, a person with a very business-like approach to task accomplishment, an awkward conflict occurred as new norms were introduced and older patterns discouraged. In fact, an adaptation occurred. The executive director jettisoned each member of the interim staff over a period of months, including support staff, and reconstituted his team by eliminating assistant positions and appointing an associate to handle administration and communication.

This associate, in turn, selected professional staff to meet the demands of the various research projects and the Policy Center's communication agenda. The adaptation reflected a response to fine-grained fluctuations through changes in rules, procedures and norms, rather than through changes in mission or products.

Over the five-year period, the Policy Center's decisions became somewhat routinized, although procedures were developed for dealing with exceptions. Decisions concerning general issues and policies were first discussed in a council composed of principal investigators and Center directors. Responsibility for decisions on research programs resided with the Executive Director. Responsibility for administration, budget, and communication resided with the Associate Director. Individual researchers made decisions affecting their own projects and staffs, once their projects had been approved and resources allocated for their use. The Research Council empowered the Executive Director to make decisions within policy bounds and occasionally specified areas where he could act alone. But on major issues, the entire Council acted as environmental scanners, bringing in new information and/or experts to guide their deliberations.

Communication among research personnel and directing personnel about projects was somewhat complicated by the fact that several subcontracts had been awarded to researchers at remote sites around the country. Center headquarters housed 22 professionals and staff, while four remote sites added another 16 individuals working on project research. Remote site research teams communicated with headquarters personnel and among each other on a daily basis via electronic mail, telephone, fax, and less frequently, through council meetings held four times annually. Center directors attended advisory meetings periodically at each remote site.

Collaborative approaches to coordination and control made it possible for information to be passed through the system horizontally, for decision-making to occur in a cooperative fashion, and for accountability to be checked through the review and refunding process. The Executive Director set the parameters for interaction, and then stepped back to watch the process work. Built into the

process was renewal of resources directly linked to successful task accomplishment from year to year. Thus, access to necessary information and resources for individual participants was constrained by the judgments of evaluators and leaders.

Perpetuation Activities

A key characteristic of self-maintenance can be seen in uncertainty reduction activities, particularly those aimed at stabilizing fluctuations in internal and external environments. Uncertainty reduction activities focus around the development of policies, rules, norms, and structures to cope with fluctuations in the environment. Early in the Center's life, managers spent a great deal of time formulating written policies related to how Center business would be handled, for example, in administrative council meetings, in areas of budgetary accountability, in the review and release of research findings, in the development and enforcement of publication standards, and in the integration of work across departments and projects. By the end of the third year, many of these policies had become norms or had been suspended informally as those in authority saw fit. Variables that influenced the development of norms and rules included: 1) degree of perceived risk to organizational life; 2) individual commitment to the organization; 3) perceived importance of organizational mission to publics; and 4) perceived positioning of the organization with the market for the created products.

Which, if any, of these dimensions would generate survival responses in a Center that could name its date of extinction? Because the end was known, employees always anticipated the Center would close. Yet the undercurrent of risk could also be explained by the annual review of projects. Thus, the revolving door for research personnel, as well as the known end of the contract period, served to increase the sense of risk among administrative and research staff. Nevertheless, many staff members harbored a notion that deliverance (or maintenance) was possible through recompetition for additional grants.

The degree of commitment to the Center was high among all members of the organization, even though an undercurrent of pessimism occasionally reared its

head. Members shared a sense of irony that such a valuable "cutting edge" service should be viewed as expendable, simply because of the nature of the funding process. There was also a sense that the mission of the Center filled a void that other policy research organizations did not adequately fill.

But did these concerns dampen the initiative of the organization to meet its obligations? Quite the contrary: Members appeared to invest greater energy in pursuing projects in a timely fashion and reaching their audiences with outcomes of research findings "before it was too late." Thus, those responsible for product development and dissemination policy routinely attended technical, advisory, and research council meetings. They conducted investigative research such as focus groups and surveys to determine the characteristics of intended audiences and planned strategies appropriate for reaching audiences with new products. Evaluation of research outcomes and product development was continuous throughout the five years.

This limited lifespan organization was very productive. Over a five-year period, the Center published 65 papers. It created policy papers that were endorsed and distributed by government agencies and corporations. It sponsored 10 national conferences. Researchers published nine books in five years. Center personnel secured invitations to address literally thousands of individuals at administrative and academic conferences. Activities continued and accelerated throughout its five-year lifespan.

In the face of collapsing markets, organizational activities became increasingly more frenetic and focused. A sense of urgency prevailed as members attempted to complete projects within the allotted time period. Decision making and communication became less routine, as the role of the leader and control over events became more exaggerated. At the same time, members began preparing for transitions to other jobs. Departures of staff caused researchers to work more autonomously. Even though activities related to inputs and outputs continued mostly in tact, the throughput of the organization began to change as the infrastructure began to disintegrate. Tenured researchers at each site subtly began to refocus on other interests and opportunities. Many of the Center's

members insulated themselves in the last year from acknowledging the center's imminent demise. They either consciously or unconsciously rejected or resisted dealing with the situation. Communication became stilted, and thus limited the amount of information that was processed, which had an impact on the effectiveness of Center perpetuation activities. A growing sense of anomie contributed to grief for those who wanted the positive and collaborative culture within the organization to continue.

Those who were faced with the decision to leave felt great conflict, and attempted to sustain their high degree of involvement. As distancing behaviors grew, so did resentment of departing personnel who felt they were becoming increasingly "invisible" to the researchers who would remain. Resentment toward leave-takers was expressed on the part of those members continuing. For example, the Executive Director was faced with the departure of the Associate Director and several support staff (assistant and 2 secretaries) fully four months before the end of operations. Departing members were hired as "temporary consultants" in order for projects to be completed within the organization's life span. Members were faced with the dilemma of matching a heightened need for productivity (time constraints) with an equally legitimate dismantling of structure.

Outcome

Center members' hopes for deliverance were not met with additional sources of funding. The Policy Center officially died at the end of its contracted five-year lifespan. Lady luck did not visit that final day. Or did it? The organization did not continue as it had before, insofar as it was unable to maintain its funding base for the mission that had been set forth by its funding authority. The organization did not manage uncertainty in the sense of creating revenue streams sufficient to sustain a level of scaled-down yet similar effort.

However, several researchers and their staffs did take steps that permitted a form of continued collaboration. One key researcher moved from an off-site location to the headquarters in order to collaborate with four other in-house researchers. Small grants were obtained by this sub-group to enable the

support of a skeleton staff. Institutional resources were provided to offset overhead costs for operations. Most importantly, this subgroup of the Policy Center adopted a new name and on resurrection day assumed a new but not totally and distinctly different identity. The angel of death passed over the Center leaving a different incarnation with many new organizational characteristics.

Conclusions

The contingency model proposed in this paper predicted that this organization would transform itself, rather than die. In the presence of environmental turbulence, information about power and conflict, and resource utilization was known. Although the organization went through a rapid change process, because information and resources were available to members, they anticipated and planned a response to avert extinction.

It was also predictable that the transformed organization would not resemble its predecessor. Where there was great individual activity, the exuberant qualities of organizational life all but disappeared. The new organization for a time continued to disseminate the old Policy Center's products of tapes and papers, however, the creation of new products, outreach, advertisements and positioning all terminated as strategies with the transformation. The research and consulting mission of the new organization, based on grants and clients, differed considerably from the old. Members of the old organization returned from time to time to touch familiar ground; however, few of the old practices and norms still existed. Members often left feeling loss and regret. A dynamic, cohesive, and purposive organization had not maintained itself or adapted to new demands. Rather it had transformed, metamorphosed, and reconstituted itself as a new organization.

The proposed model accounts for the transformation that occurred in this Policy Center. But further application of the model will be a necessary next step in establishing it predictive power. The model points to the need for greater elaboration of the degree to which environmental factors contribute to uncertainty reduction activities. In addition, investigation of types of

uncertainly reduction activities as mediated by degree of perceived risk, commitment, and competitive position, as well as other context dependent variables, should help to specify more clearly how change outcomes occur.

Organizations have unique functions for self-maintenance and perpetuation over time, regardless of function or mission. Environmental factors coupled with uncertainty reduction capabilities, as they are influenced by structure and design processes, directly influence how organizations change over time. The ways in which organizations maintain, adapt, transform, and collapse are infinitely interesting, especially as we try to understand what may guide these successful and unsuccessful perpetuation activities.

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